

## IN THE DESCRIPTION OF THE PREFERRED EMBODIMENT-MARKED UP VERSION

1        Referring now to the drawings wherein the showings are for the purpose of illustrating  
2 preferred embodiments of the invention only and not for the purpose of limiting it. The invention  
3 is a novel design for a nozzle hub 1 depicted in **Figure 1** that enables removal of the nozzle core  
4 17 shown in **Figure 6** for replacement. It is preferred that the hub 1 be made in one, monolithic  
5 unit that surrounds, supports and secures the nozzle core 17 to increase the resistance of the core  
6 17 to deformation or strain that occurs due to force from pressure acting on the interior surface  
7 area. A flared wall 12 locates the core 17 in relation to the Lure threaded hub for both reusable  
8 mechanical hub and brazed hub connection assemblies. **Figure 5** is a side-by-side illustration of  
9 the hub 16 brazed to the nozzle core 17 and the nozzle core 17 installed in the reusable hub 1.

10 The concept behind each design is different, according to the sensitivity of the dispensing process  
11 to the thermal response rate. In the first nozzle hub design 16, the hub 16 is brazed to the nozzle  
12 core 17 enabling fast heat transfer from the hub 16 to the core 17. This design trades increased  
13 cost for superior advantage in thermal response rate. The second design separates nozzle core 17  
14 from nozzle hub 1 reducing cost to the customer by allowing replacement of the contiguous core  
15 17 held by the hub 1. The hub 1 is retained to use for holding the next core 17. This design  
16 trades the advantage in thermal response rate to gain an advantage in cost.

17        (Turning now to the drawings wherein elements are identified by numbers and like  
18 elements are identified by like numbers throughout the three figures, the) The inventive nozzle  
19 hub 1 is depicted in **Figures 1-3**, in vertical or near vertical attitude and in **Figure 4** in horizontal  
20 attitude and comprises a exterior cylindrically shaped barrel wall 2 extending downward about 7  
21 to 8 millimeters to an exterior groove 3 that spans 1 millimeter then outward to a break point  
22 defined by a hexagonal shaped barrel wall 2 extending downward to an exterior groove 3 then  
23 outward to a break point defined by a hexagonal shape spaced apart from the groove 3 at about  
24 30 degrees 4 . The purpose of the groove 3 is to aid in installation of a device that applies heat  
25 to the fund-us 6. An exterior cylindrically shaped barrel wall 2 performs the function of securing  
26 the nozzle hub 1 and nozzle core 17 to a reservoir 18 from which a viscous fluid is transferable,  
27 **Figure 7.**

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1           Extending downward there-from along the faces 5 to an adjacent fund-us with a  
2 hexagonal perimeter 6 is about 4 to 6 millimeters. Faces 5 of the hexagonal shape measure  
3 between 5 and 25 millimeters and more preferably about 8-12 millimeters between parallel faces  
4 5 facilitate use of a wrench for application of torque to the hub for installation and removal and  
5 increase surface area for convective transfer of thermal energy.

6           An interior cylindrically shaped barrel wall 7 is made with a slight inward cast or slant  
7 such as between 1 and 5 degrees and more preferably between 2 and 4 degrees from upper  
8 surface 8 to a fund-us 6. It is further preferred that the interior cylindrically shaped barrel wall  
9 be made circular and limited to about 25 millimeters in diameter. This helps to support and align  
10 the nozzle core 17 to form a leak proof connection to the Luer-taper. A groove 10 with a ledge  
11 11 and a flare 12 extending inward from the perimeter 13 is intersected by a horizontal furrow 9  
12 that is about 0.5 to 0.75 millimeters across and about 1 or 2 millimeters from the top circular  
13 surface 8. The horizontal furrow 9 originates from a flat surface 15 recessed below the  
14 cylindrically shaped wall 2 extending upward to the top circular surface 8.

15           The longitudinal slot 14 extends downward along the hub 1 set inward at an acute angle  
16 is parallel to the interior cylindrically shaped barrel wall 7 and has a wall convergence between  
17 about 6 to 8 degrees included. The ratio of the diameter of the interior cylindrically shaped  
18 barrel wall 7 measured at any elevation between the tangency point at the intersection of the flare  
19 extending inward from the perimeter 19 and the fund-us 6 to the width of the longitudinal slot 14  
20 descending along the hub 1 set inward at an acute angle measured at an identical elevation  
21 exceeds 0.5. The longitudinal slot 14 extends downward along the hub 1; the nozzle core is  
22 compressed moving through the slot 14, sliding along the horizontal furrow 9 intersecting the  
23 groove 10, spaced tangent to the ledge 11 defined by the vertical perimeter 10, expanding to  
24 locate the nozzle core on the flare 12, extending inward from the vertical perimeter 13.

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1           In the preferred embodiment of the invention, for applications that require a heated fluid  
2 path, it is preferred that nozzle hub 1 be made from a thermally conductive material, such as  
3 copper. More particularly, it is preferred that thermally conductive material, such as copper  
4 comprises at least 90% by weight of metal for the best thermal response. Nozzle hubs 1 used in  
5 applications where heat is not necessary can be made of any material that (is suitable) can be  
6 machined or molded.

7           While the invention has been described with reference to a particular embodiment  
8 thereof, those skilled in the art will be able to make various modifications to the described  
9 embodiment of the invention without departing from the true spirit and scope thereof. It is  
10 intended that all combinations of elements and steps, which perform substantially the same  
11 function in substantially the same way to achieve substantially the same result, be within the  
12 scope of this invention.

## IN THE DESCRIPTION OF THE DRAWINGS - FIGURES - AMENDED VERSION

1        Turning now to the drawings wherein elements are identified by numbers and like  
2 elements are identified by like numbers throughout the seven figures, the novel design of a  
3 reusable nozzle hub 1 is depicted in **Figures 1-4**. **Figure 1** is an illustrative view of the  
4 invention from an elevated vantage point; **Figure 2** is an illustrative eye level view of the  
5 invention. **Figure 3** is an illustrative close up view of a detail shown in **Figures 1 and 2**. **Figure**  
6 **4** is an illustrative section view of the interior groove 10 with a ledge 11 of the nozzle hub 1.  
7 **Figure 5** shows the nozzle hub 16 used when a permanent brazed connection is desired next to  
8 the novel reusable hub 1. **Figure 6** is a front view of the nozzle core 17 that fits the brazed hub  
9 16 or the reusable hub 1. **Figure 7** is an illustrative view from an elevated vantage point of the  
10 reusable hub 1 and nozzle core 17 connected to a reservoir 18.

## IN THE DESCRIPTION OF THE DRAWINGS - FIGURES - MARKED UP VERSION

1        Turning now to the drawings wherein elements are identified by numbers and like  
2 elements are identified by like numbers throughout the (six) seven figures, the novel design of a  
3 reusable nozzle hub 1 is depicted in *Figures 1-4*. *Figure 1* is an illustrative view of the  
4 invention from an elevated vantage point; *Figure 2* is an illustrative eye level view of the  
5 invention. *Figure 3* is an illustrative close up view of a detail shown in *Figures 1 and 2*. *Figure*  
6 *4* is an illustrative section view of the interior groove 10 with a ledge 11 of the nozzle hub 1.  
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